

ABSTRACT OF THE INVENTION

The invention relates to a novel image-reconstruction technique which is used to view multiphase flows using electrical capacitance tomography (ECT), which is based on non-linear heuristic global optimization methods involving simulated annealing and genetic algorithms. The inventive method consists in obtaining electrical capacitance data which are measured between electrodes positioned on the outer surface of pipeline, well or tank (electrically-insulating) containing fluids. The aforementioned data are dependent on the distribution of the fluids inside the pipeline, well or tank. Moreover, the data are processed in order to reconstruct an image of the spatial distribution of the relative electrical permittivity (also known as the dielectric constant) inside the tube, well or tank, which reflects the distribution of the different phases present in the flow.